

STATE OF MAINE

DEPARTMENT OF TRANSPORTATION



CHURCHILL BROOK BRIDGE

OVER

CHURCHILL BROOK

IN THE TOWN OF

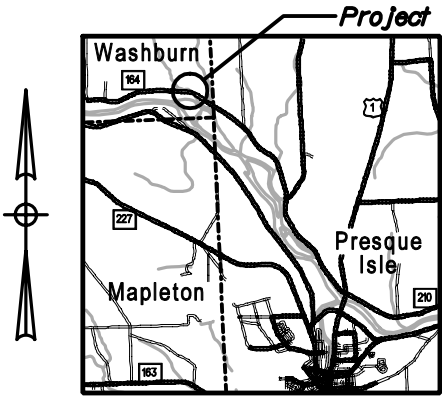
WASHBURN

AROOSTOOK COUNTY

PROJECT LENGTH 0.070 km

BRIDGE REPLACEMENT

BRIDGE NO. 3630



LOCATION MAP



DESIGN REQUIREMENTS

The precast concrete box culvert shall be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, current edition, by either the Load Factor Design (LFD) or Load and Resistance Factor Design (LRFD) method. The design live load shall be as follows: MS-22.5 (HS-25) for LFD method, *modified HL-93 Strength 1 for LRFD method. *(modify HL-93 by increasing all wheel loads by a factor of 1.25)

The precast concrete box culvert shall be designed for the following load cases:

1. Fill height over the structure as shown on the plans.
2. Future possible increase in grade over the structure to elevation 135.000 m at the construction centerline.
3. Construction loads with a minimum of 450 mm (18") of fill on top of the entire structure.

TRAFFIC DATA

Current (2001) AADT	1770
Future (2021) AADT	2130
DHV - % of AADT	9%
Design Hour Volume	192
% Heavy Trucks (AADT)	6%
% Heavy Trucks (DHV)	5%
Directional Distribution (DHV)	77%
80 kN Equivalent P 2.0	46
80 kN Equivalent P 2.5	45
Design Speed (km/h)	80 kph

HYDROLOGIC DATA

Drainage Area	1812 hectares
Design Discharge (Q50)	23.7 m ³ /s
Check Discharge (Q100)	27.6 m ³ /s
Headwater Elevation (Q50)	131.79 m
Headwater Elevation (Q100)	131.94 m
Discharge Velocity (Q50)	3.26 m/s
Discharge Velocity (Q100)	3.43 m/s
Discharge Velocity (Q1.1)	1.72 m/s
Headwater Elevation (Q1.1)	130.25 m
Discharge(Q1.1)	3.5 m ³ /s

UTILITIES

Adelphia Communications Corp., Verizon
Maine Public Service Company

MATERIALS

Precast Concrete Box Culvert	Class "P"
All Other Concrete	Class "LP"
Reinforcing Steel	ASTM A 615/A 615M, Grade 420

BASIC DESIGN STRESSES

Precast Concrete Box Culvert	f 'c = 35 MPa
All Other Concrete	f 'c = 35 MPa
Reinforcing Steel	f y = 420 MPa

MAINTENANCE OF TRAFFIC

One lane of traffic 3.3 m wide shall be maintained at all times during construction using temporary traffic signals.

LIST OF DRAWINGS

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All work contemplated under this contract shall be governed by and be in conformity with the Standard Specifications (Revision of April 1995), the Standard Details (April 1997), The Supplemental Specifications and Supplemental Standard Details for Construction (February 1, 2001) thereto, except as modified by the plans or specifications special provisions.

A hydrologic report of the bridge site is available for the Contractor's reference at the Bridge Design office in Augusta. The hydrologic report is based on the Department's interpretation of information obtained for the subject site. No assurance is given that the information or the conclusions of the report will be representative of actual conditions at the time of construction.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

APPROVED:

COMMISSIONER	DATE
CHIEF ENGINEER	DATE

CASWELL ENGINEERING, P.A.
Structural Consultants

56 Maine Street
Brunswick, Maine 04011
(207) 725-6221

PROJECT DESIGN ENGINEER				BY	DATE
DESIGN-DETAILED				J. BURGESS	4/02
CHECKED				E. CASWELL	4/02
REVISIONS					
FIELD CHANGES					

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Box Culvert Notes

1. The precast concrete box culvert shall be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, current edition, by either the Load Factor Design (LFD) or Load and Resistance Factor Design (LRFD) method. The design live load shall be as follows: MS-22.5 (HS-25) for LFD method, *modified HL-93 Strength I for LRFD method, *modify HL-93 by increasing all wheel loads by a factor of 1.25)

The precast concrete box culvert shall be designed for the following load cases:

- I Fill height over the structure as shown on the plans.
 - II Future possible increase in grade over the structure to elevation 135.000 m at the construction centerline.
 - III Construction loads with a minimum of 450 mm (18") of fill on top of the entire structure.
2. Form a 30 mm V-groove at the front face of vertical contraction and construction joints.
 3. Reinforcing steel shall have 50 mm concrete cover unless otherwise indicated.
 4. Granular Borrow shall meet the requirements of Subsection 703.19, Material for Underwater Backfill.
 5. Cover the vertical contraction and construction joints on the back in accordance with the Standard Details. Cover the contraction joints in the top slab in the same manner but without recessing the concrete.
 6. Concrete used for the culvert shall be class P.
 7. The construction, handling, and assembly of the precast units shall be in accordance with Special Provision Section 534 Precast Structural Concrete, and with the Manufacturer's Specifications as applicable.
 8. Install membrane waterproofing over the top and 300 mm down the exterior sides of the precast units.
 9. The concrete for the precast box shall have a maximum permeability of 3,000 Coulombs.
 10. The fabrication, delivery and installation of the galvanized steel angle, fasteners and any incidentals will not be paid for directly. Payment will be considered incidental to Item 534.7101, Precast Concrete Box Culvert - State Supplied.
 11. The hand placed hot mix asphalt behind the concrete curbs shall be paid for under Item 403.209, Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Sidewalks, Drives, Islands, and Incidentals.)
 12. Protective Coating for Concrete Surfaces shall be applied to the following areas:
All faces of concrete curbs.
Tops of Precast Concrete Box Inlet and Outlet walls (sloping) and down 300 mm from top each face.

General Construction Notes

1. All utility facilities shall be adjusted by the respective utilities unless otherwise noted.
2. For easements, construction limits and right-of-way lines refer to Right of Way Map.
3. During construction, a minimum roadway width of 3 300 mm shall be maintained at all times. The materials, excavation, installation, and removal of sheet piling, or other means necessary for braced excavations, shall be included in the unit price for Item 652.39 Work Zone Traffic Control.
4. Place a 600 mm wide strip of Temporary Erosion Control Blanket along the top of the riprap.
5. All embankment material, except as otherwise shown, shall be granular borrow meeting the requirements of Subsection 703.19, Material for Underwater Bankfill.
6. The clearing limits as shown on the plans are approximate. The exact limits shall be determined in the field by the Engineer. Payment shall be incidental to Contract Items.
7. Place loam, 50 mm deep, on side slopes between limits of work.
8. Do not excavate for Aggregate Subbase Course where existing material is suitable as determined by the Engineer. Payment for shaping and compacting of the existing subbase and layers of new subbase 150 mm or less thick, in areas where the Engineer directs the Contractor not to excavate to the subgrade line shown on the plans, will be made in accordance with Section 109 of the Supplemental Specifications.
9. Two guardrail delineator posts shall be installed at each leading guardrail end and one at each trailing end.
10. Modified eccentric loader terminals shall be installed concurrently with the placement of each section of beam guardrail.
11. Guardrail shall be installed after base pavement has been installed. Surface pavement course will be placed continuously on all based pavement areas including those under guardrail sections with no joints at the shoulder. Payment for hand work underneath guardrail will be considered incidental to Item 403.208, Hot Mix Asphalt (12.5 mm).
12. Yellow RPMs will be installed on base coat of pavement and after surface coat. Payment will be incidental to pavement items. Final striping will be done a minimum of three weeks after paving of surface.
13. Guardrail post length and embedment as shown in the Standard Details shall be modified from the indicated 1830 mm length to 2130 mm with a 1400 mm embedment.
14. Removal of the two existing 1829 mm (6') diameter pipes will not be paid for directly. Removal will be considered incidental to Item 206.082, Structural Earth Excavation - Major Structures.

Date: 30 MAY 2002

Username: Rich Nimon

Division: BRIDGE

Filename: ...003_boplan1.dgn

PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	J. BURGESS	4/02
CHECKED	J. CASWELL	4/02
REVISIONS	E. CASWELL	
FIELD CHANGES		

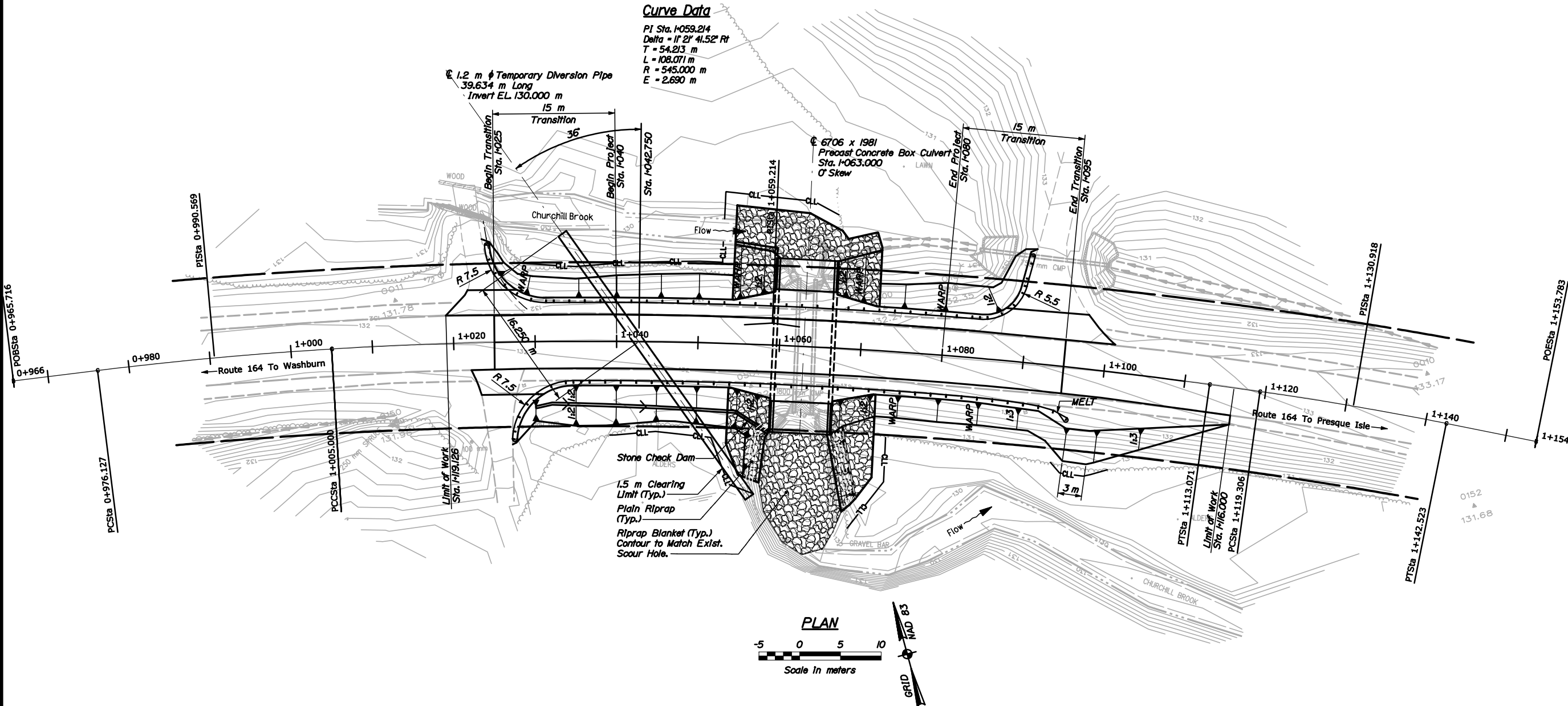
PLANS

METRIC

1. All dimensions are in millimeters unless otherwise noted.
2. All elevations and stations are in meters.

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	STP-1005(400)X	3	12

PIN 10054.00



BRIDGE NO. 3630

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

CHURCHILL BROOK BRIDGE
OVER
CHURCHILL BROOK
IN THE TOWN OF
WASHBURN
AROOSTOOK COUNTY

GENERAL PLAN

SHEET OF AUGUSTA, MAINE

Date:30 MAY 2002

Username: Rich Nimon

Division: BRIDGE

Filename: ...0004_profile.dgn

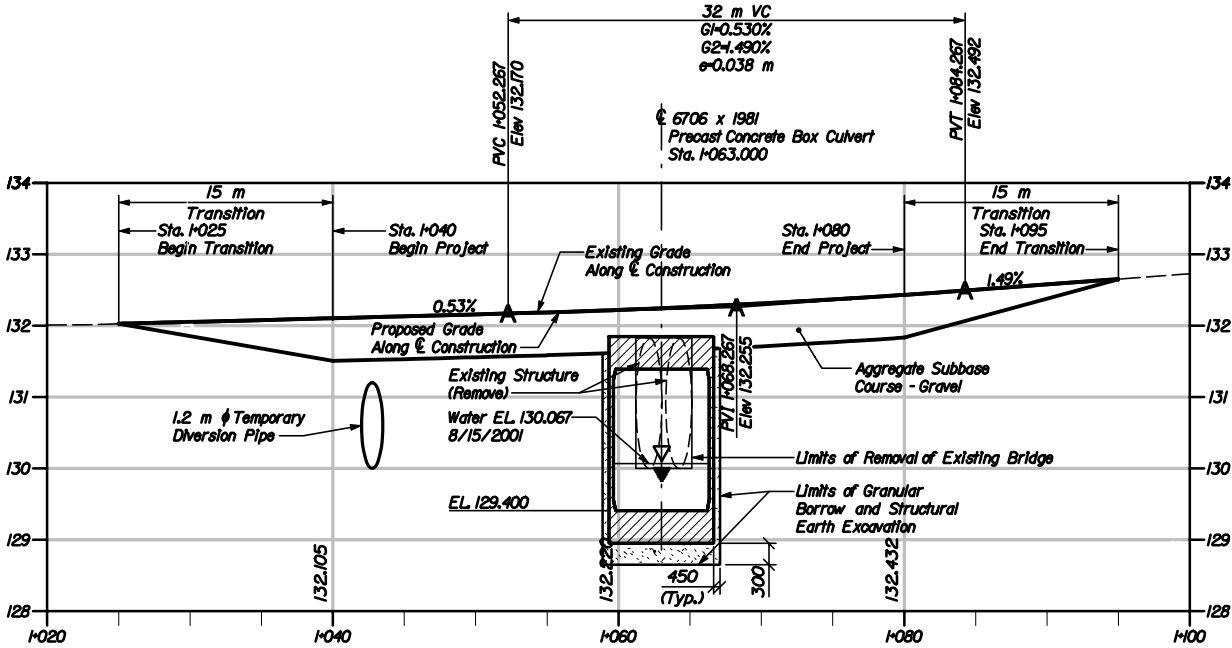
PROJECT DESIGN ENGINEER		BY	DATE
PLANS	DESIGN-DETAILED	J. BURGESS	4/02
	CHECKED	J. CASWELL	4/02
	REVISIONS	E. CASWELL	
	FIELD CHANGES		

METRIC

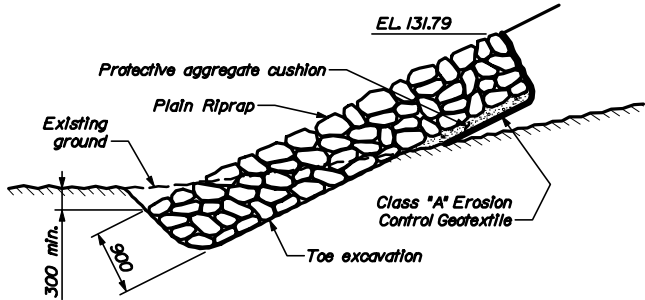
1. All dimensions are in millimeters unless otherwise noted.
2. All elevations and stations are in meters.

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	STP-1005(400)X	4	12

PIN 10054.00



PROFILE ALONG C CONSTRUCTION



TYPICAL RIPRAP SECTION

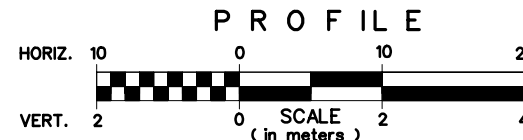
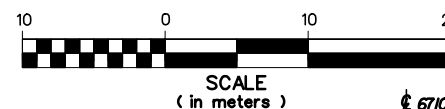
All Bedding Material placed in the embankment slope under the riprap and within 300 mm of the back side of riprap areas shall meet the requirements of Subsection 703.19, Material for Underwater Backfill.

BRIDGE NO. 3630

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

CHURCHILL BROOK BRIDGE
OVER
CHURCHILL BROOK
IN THE TOWN OF
WASHBURN
AROOSTOOK COUNTY
PROFILE

SHEET OF AUGUSTA, MAINE



BRIDGE NO. 3630

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

CHURCHILL BROOK BRIDGE
OVER
CHURCHILL BROOK
IN THE TOWN OF
WASHBURN
AROOSTOOK COUNTY
FOUNDATION SURVEY

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PROJECT	DESIGN ENGINEER	BY	DATE
	DESIGN-DETAILED	P.DUNN	T.WHITE
	CHECKED		
	REVISIONS		
	FIELD CHANGES		

PLANS

Date: 30 MAY 2002

Username: Rich Nimon

Division: BRIDGE

Filename: ...006_xsect1.dgn

PROJECT DESIGN ENGINEER	BY	DATE
J. BURGESS	J. CASWELL	4/02
CHECKED	E. CASWELL	4/02
REVISIONS		
FIELD CHANGES		

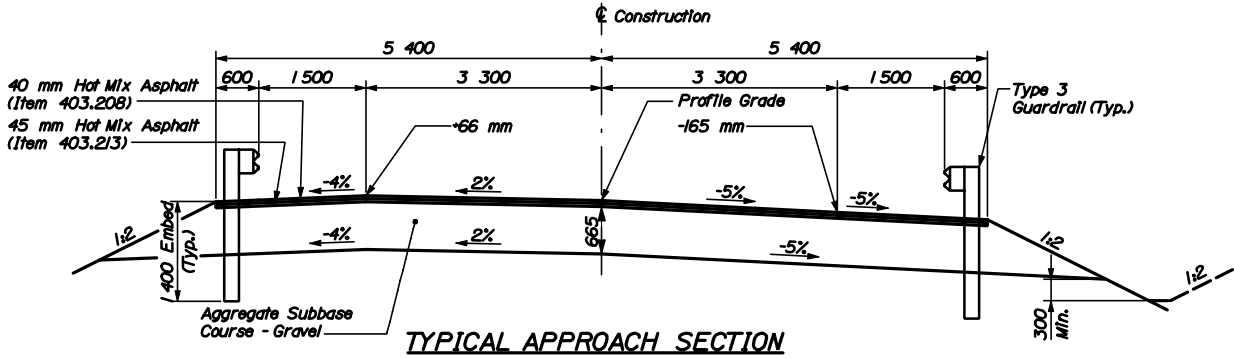
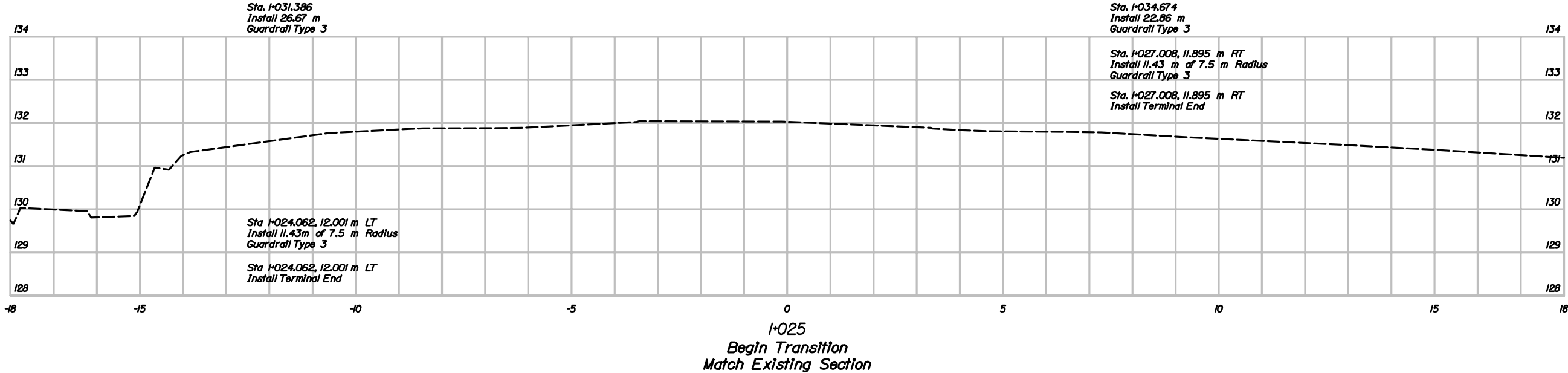
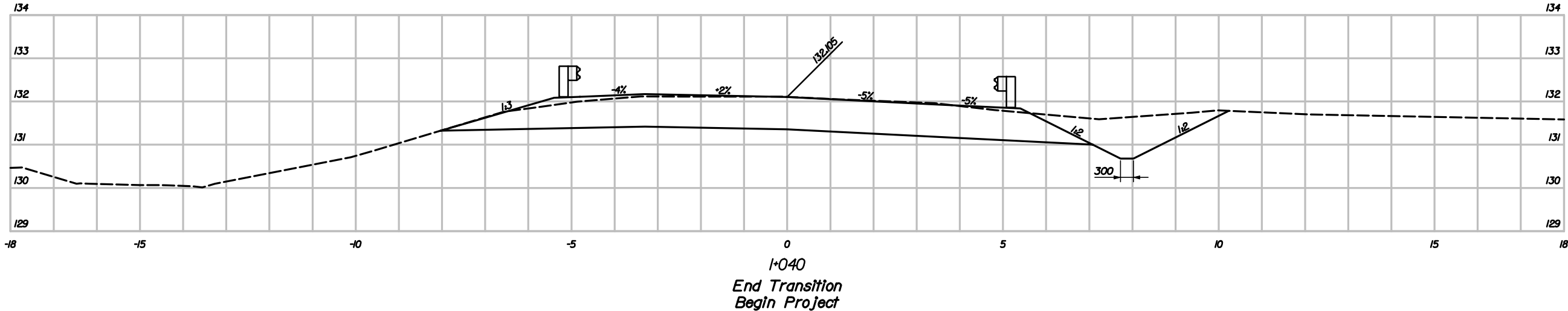
PLANS

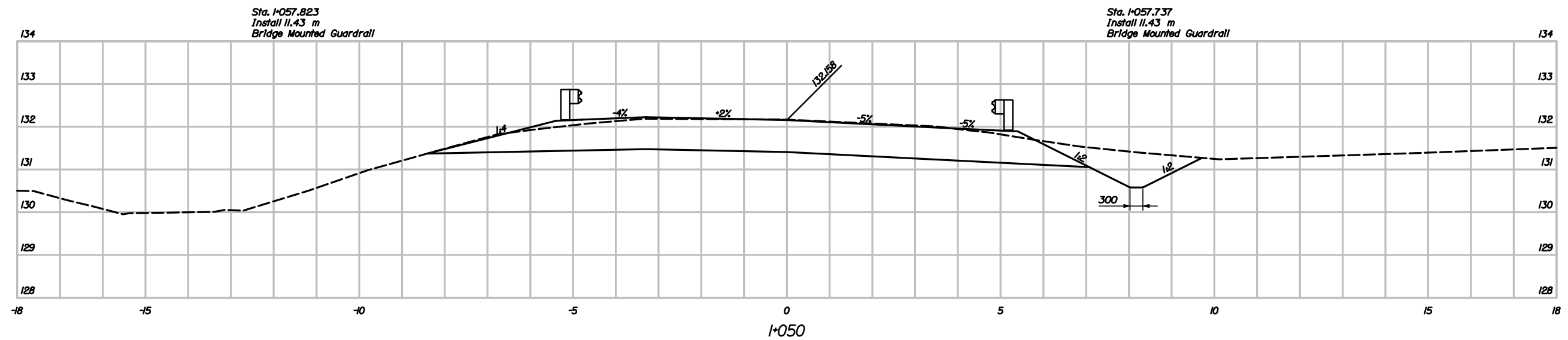
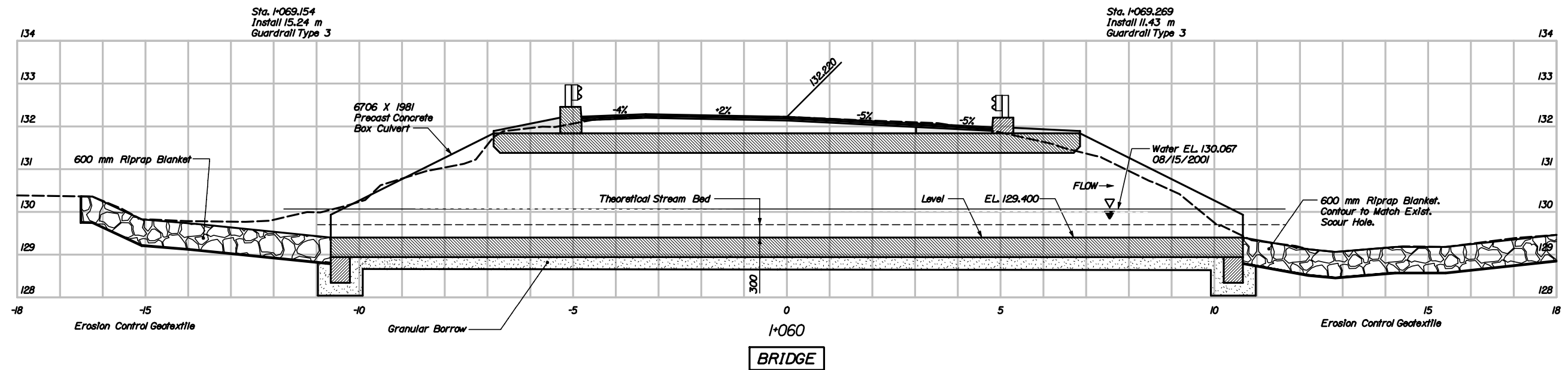
METRIC

1. All dimensions are in millimeters unless otherwise noted.
2. All elevations and stations are in meters.

F.A.W.A. RES. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	STP-1005(400)X	6	12

PIN 10054.00





STA. 1+050 TO STA. 1+070

Date: 30 MAY 2002

Username: Rich Nimon

Division: BRIDGE

Filename: ...008_xsect3.dgn

PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	J. BURGESS	4/02
CHECKED	J. CASWELL	4/02
REVISIONS	E. CASWELL	
FIELD CHANGES		

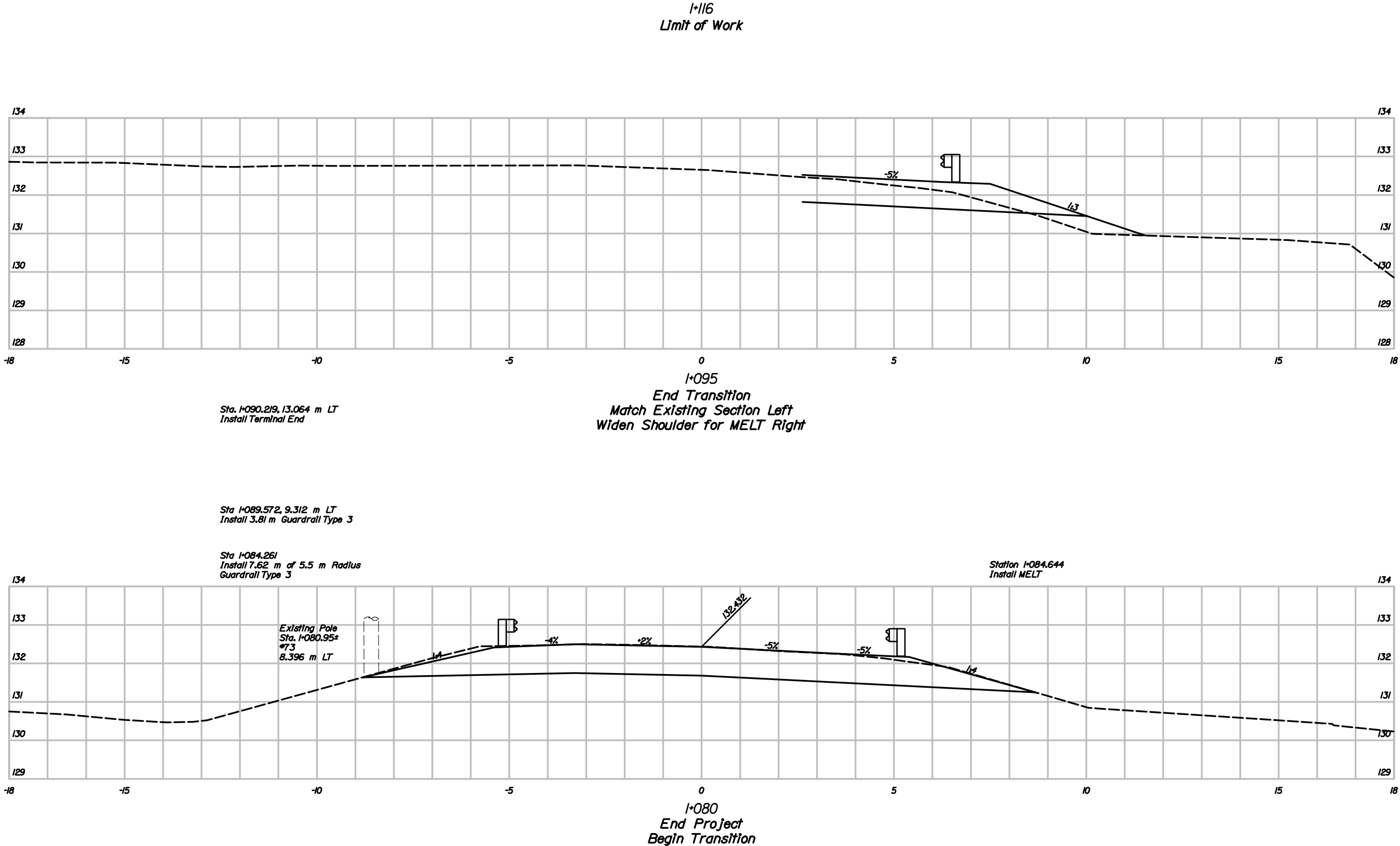
PLANS

METRIC

- All dimensions are in millimeters unless otherwise noted.
- All elevations and stations are in meters.

F.A.W.A. RES. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	STP-1005(400)X	8	12

PIN 10054.00



Date:30 MAY 2002

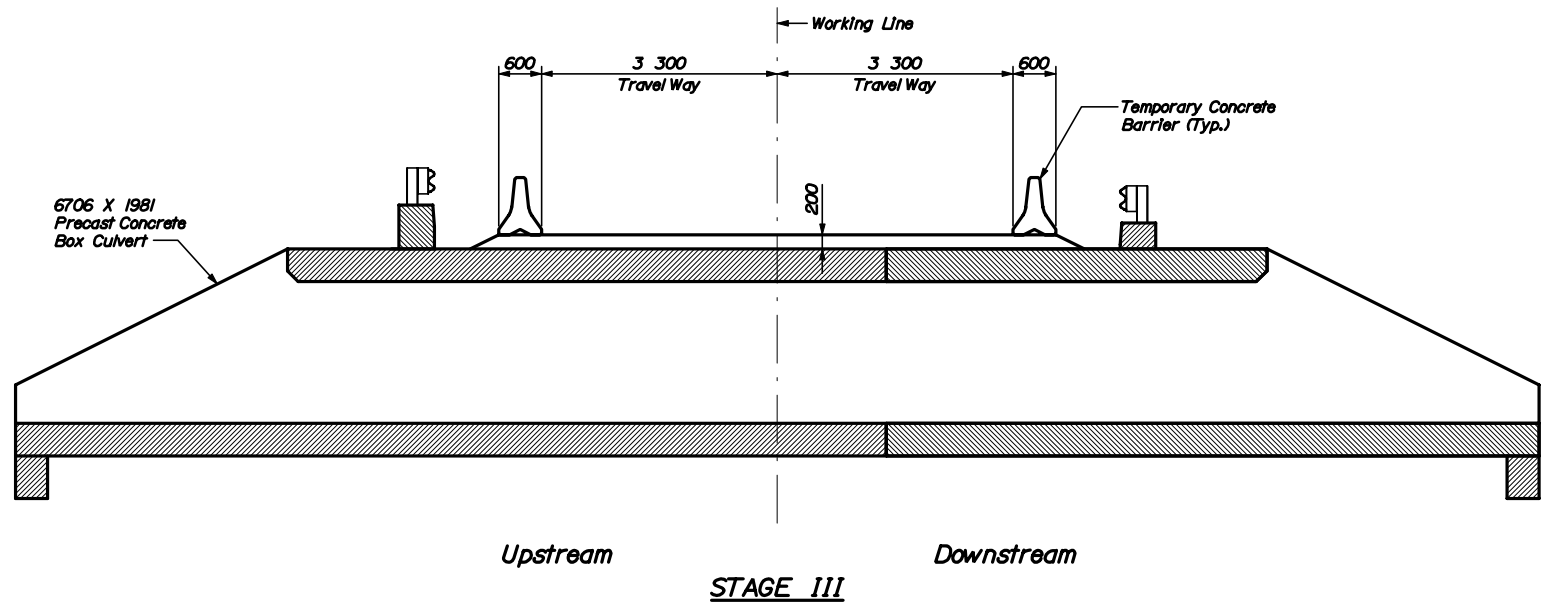
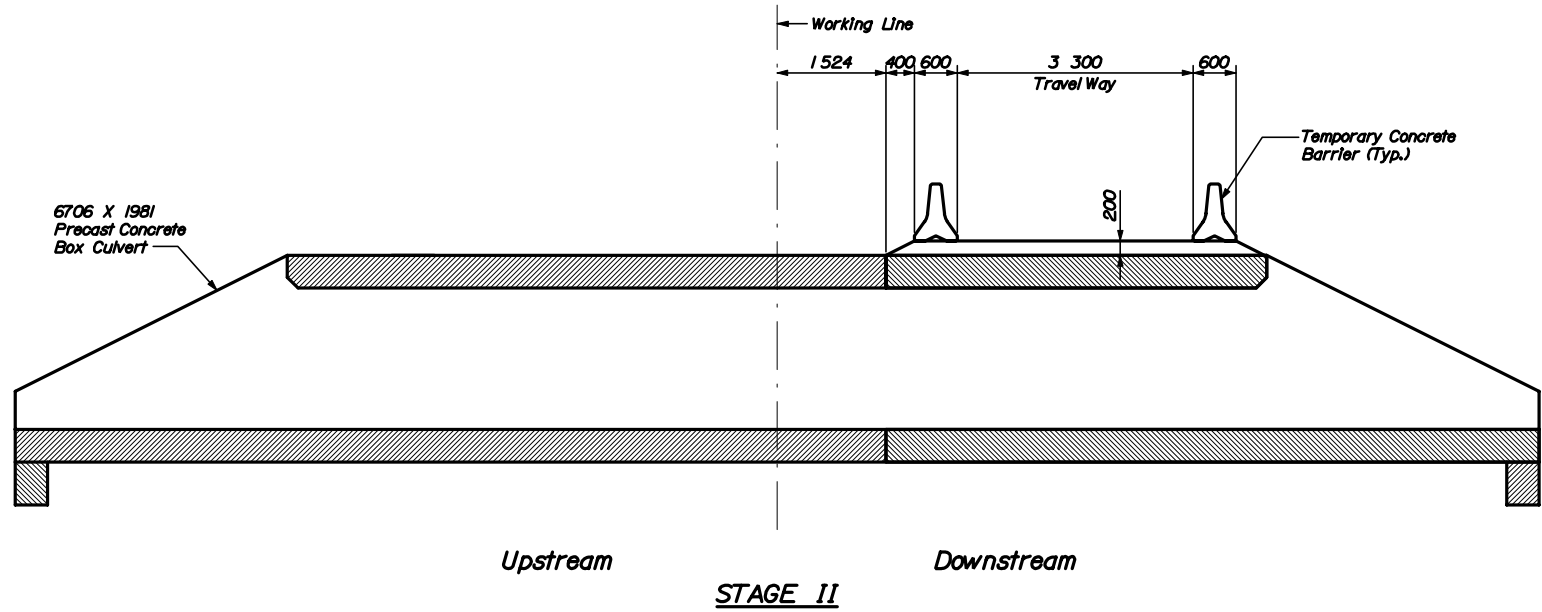
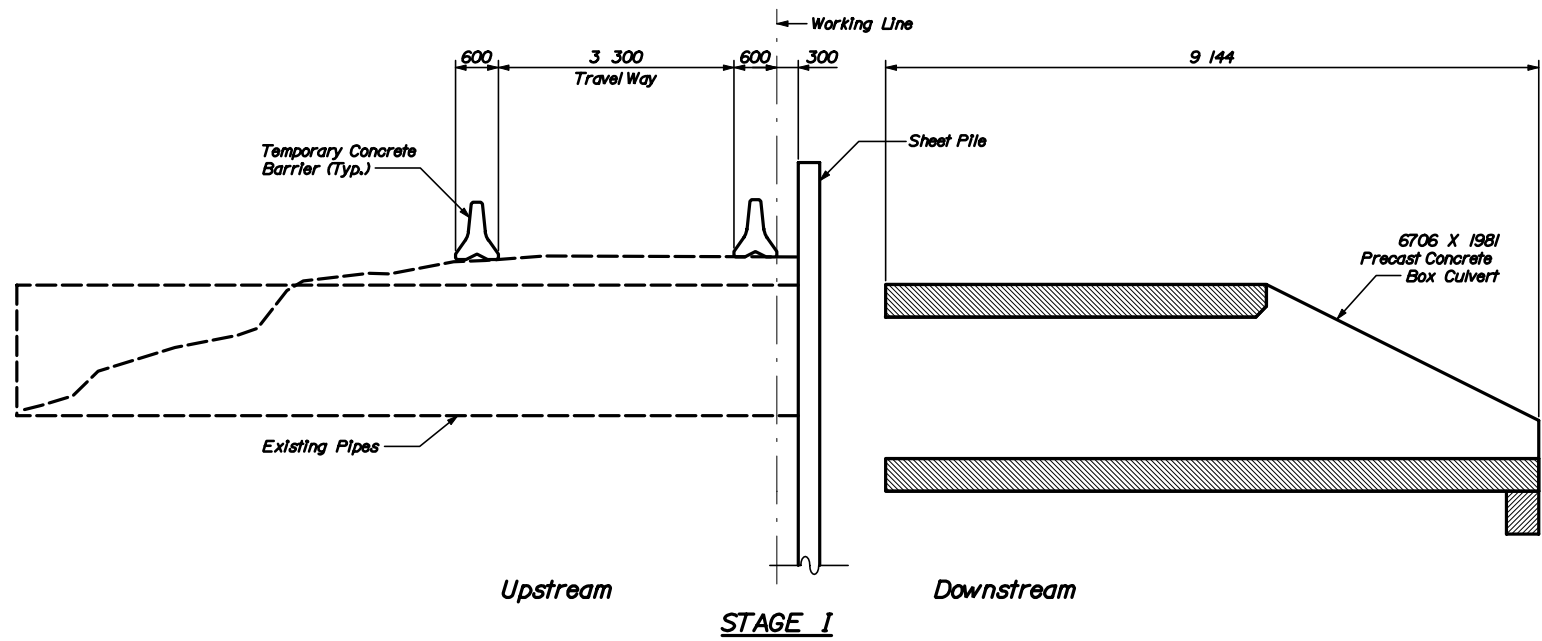
Username: Rich Nimon

Division: BRIDGE

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PROJECT DESIGN ENGINEER	BY	DATE
J. BURGESS	J. CASWELL	4/02
CHECKED	E. CASWELL	4/02
REVISIONS		
FIELD CHANGES		

PLANS



METRIC

1. All dimensions are in millimeters unless otherwise noted.
2. All elevations and stations are in meters.

F.A.W.A. RES. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	STP-1005(400)X	9	12
PIN 10054.00				

Staged Construction Notes

Stage I During Stage I, the existing twin 1829 mm (6') diameter pipes shall be braced internally to prevent the pipes from falling. The internal bracing shall be spaced at a maximum interval of 1.5 m along the centerline of the pipe. The bracing shall start at the working line and extend upstream a minimum of 4.5 m. The bracing system shall be approved by the Engineer before be installed. This internal bracing will not be paid for directly. It will be considered incidental to item 652.39 Work Zone Traffic Control.

Upstream: Maintain one 3.3 m travel lane on existing road.

Downstream: Install 9.144 m of precast concrete box culvert.

Stage II

Upstream: Maintain one 3.3 m travel lane (min. 200 mm fill) on top of downstream section of precast concrete box culvert.

Downstream: Install remaining sections of precast concrete box culvert.

Stage III:

Maintain two 3.3 travel lanes (min. 200 mm fill) on top of precast concrete box culvert during installation of cast in place curbs.

BRIDGE NO. 3630

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

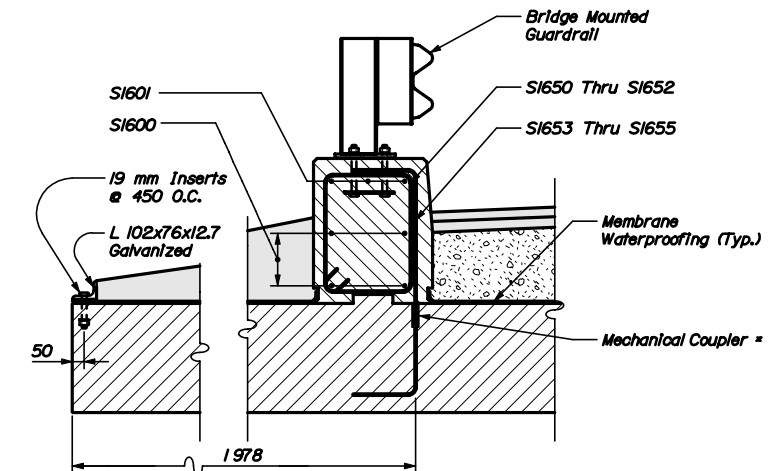
CHURCHILL BROOK BRIDGE
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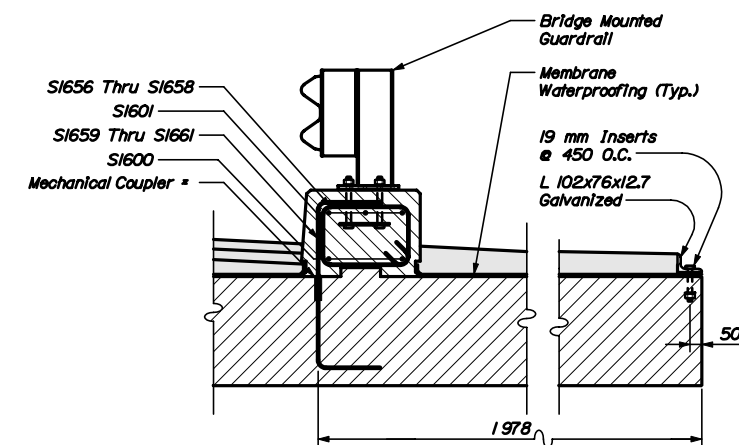
STAGED CONSTRUCTION

SHEET OF AUGUSTA, MAINE



Upstream Curb Detail

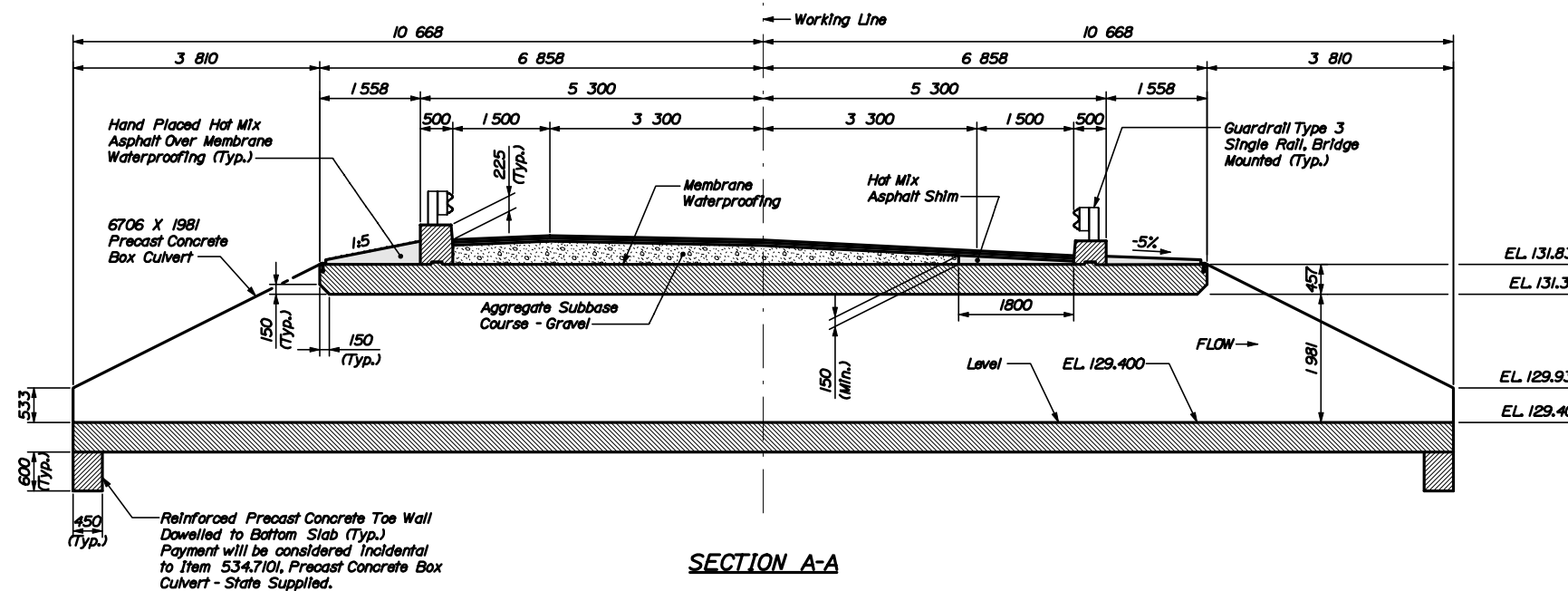
* NOTE:
Payment for Mechanical Coupler with bent bar set in Precast Concrete Box Culvert shall be incidental to Item 534.710I, Precast Concrete Box Culvert - State Supplied.



Downstream Curb Detail

* NOTE:
Payment for Mechanical Coupler with bent bar set in Precast Concrete Box Culvert shall be incidental to Item 534.7101, Precast Concrete Box Culvert - State Supplied

Top of Curb Elevations					
	Sta. 1+059.342	Sta. 1+061.171	Sta. 1+063.000	Sta. 1+064.829	Sta. 1+066.658
Upstream	132.446	132.460	132.475	132.491	132.508
Downstream	132.200	132.214	132.229	132.245	132.262



SECTION A-A

PROJECT DESIGN ENGINEER		BY	DATE
PLANS	DESIGN-DETAILED	J. BURGESS	4\02
	CHECKED	E. CASWELL	4\02
	REVISIONS		
	FIELD CHANGES		

